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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/616,608	07/14/2000	Chika Honda	KOT-0014	6146

7590 11/16/2004  
Cantor Colburn LLP  
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EXAMINER

CHURCH, CRAIG E

ART UNIT PAPER NUMBER

2882

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.



**UNITED STATES DEPARTMENT OF COMMERCE  
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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

**Serial Number: 09/616,608  
Filing Date: July 14, 2000  
Appellant(s): Honda et al**

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**Lisa Bongiovi  
For Appellant**  
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**EXAMINER'S ANSWER**  
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**MAILED**  
NOV 16 2004  
**GROUP 2800**

This is in response to the brief on appeal filed August 12, 2004

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is misrepresentative and misleading. While the brief portrays the invention as phase contrast radiography, the appealed claims contain absolutely no limitations (nor even a mere reference) to phase contrast imaging.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 2, 5-11 and 26 stand or fall together.

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

5,305,365

Robert Coe

04/19/1994

Physics of Radiology, Anthony Wolbarst, 1993, p 196-199, 202, 220-222

(10) *Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

The following is a quotation of 35 U.S.C. ' 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 2, and 5-11 and 26 are rejected under 35 U.S.C. 103 as being unpatentable over Wolbarst in view of Coe (5305365). Wolbarst describes the characteristics of an x-ray mammograph and specifically teaches that they employ a molybdenum target (page 220) with a focal spot of .1 mm (page 197) and a minimum source-to-image distance of 40 cm (page 202). Coe teaches that a mammograph may be operated with a source-to-image distance of 76 cm, and with a magnification of 1.5 as recommended by Wolbarst (page 221), the source-to-object distance would be 50 cm. It is obvious that appellant's claims read on the Wolbarst mammograph with a focal spot size of .1 mm (100 microns), SID of 76 cm and SOD of 50 cm.

(11) *Response to Argument*

The rejection of the appealed claims stems from the recognition that they contain absolutely no limitations (nor even a mere reference) to phase contrast imaging but rather prescribe a set of parameters that are employed routinely in conventional mammographic imaging as is outlined by the Wolbrst text book.

The first requirement is that the size of the focal spot of the x-ray tube utilized to image the breast lie within the range of 100-600  $\mu\text{m}$ . Page 197 of Wolbarst teaches to use a focal spot of .1 mm (100  $\mu\text{m}$ ) with image magnification

X rays diverge or spread out from their point of origin or focal spot of the x-ray tube, and if the image sensor is spaced from the breast instead of being right next to it, an enlarged image is formed. Such divergence and magnification is shown in figure 25-2 on page 221 of Wolbarst. The amount of magnification M is equal to the source-to-image distance divided by the source-to-object distance:

$$M = \text{SID}/\text{SOD} = \text{source-to-image distance}/\text{source-to-object distance}$$

See the exercise on page 198.

The second requirement defines the source-to-object distance SOD or R1. If Wolbarst's focal spot size of 100  $\mu\text{m}$  is plugged into applicant's equation, it is seen that R1 or SOD should be between (100 – 7)/200 meters and 5 meters or between 47 cm and 5 m. Coe delineates a mammographic source-to-image distance of 76 cm (lines 60-63 of column 4). Consequently, with a magnification of 1.5 the source-to-object distance would be

$$\text{SID}/M = 76/1.5 = 51 \text{ cm}$$

And R1 of 51 cm is within applicant's claimed range.

The third requirement is that the distance between the object and the image detector is between .15 m (15 cm) and 1.4 m. But if R1 (SOD) is 51 cm as above, then

$$R2 = 76 - 51 = 25 \text{ cm}$$

which is within applicant's claimed range.

Wolbarst explicitly teaches the claimed focal spot size and a magnification of 1.5, and the only issue here is the obviousness of employing an SID (R1) of 76 cm as suggested by Coe. Note also that even though appellant's brief disparages the Wolbarst use of magnification, some of appellant's own embodiments recommend it.

Page 202 Of Wolbarst reveals the factors to be considered in determining what SID should be utilized in mammographic imaging. The optimum distance is a tradeoff between patient dose, x-ray tube heating, image distortion and resolution and exposure time. This section concludes:

The range of SIDs used in clinical practice has been arrived at by balancing these considerations of image quality, patient dose, and x-ray tube longevity. *As a general rule, in most situations one should use as large an SID as the equipment can readily tolerate.* Dental radiography is one notable exception. And sometimes a relatively small SID (but not less than 40 cm = 15 in.) is employed in mammography.

This imperative to image with as large an SID as physically practical would have lead one of ordinary skill in the art (this is the motivation) to set SID at 76 cm as taught by Coe. While appellant argues that it would not have been obvious to follow Coe's selection of 76 cm because Coe's x-ray beam is tilted and because Coe's image is not magnified, neither of these factors is relevant as discussed by Wolbarst. Rather magnification is achieved by spacing the x-ray detector away from the breast and not by altering SOD as argued by appellant.

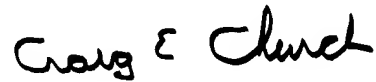
The above quoted portion of Wolbarst declares that an SID of 40 cm is an absolute minimum which clearly implies that SID should be larger than 40 cm, and if one used an

SID of only 45 cm (clearly implied by Wolbarst) all of applicant's parameters would have been met by Wolbarst without Coe's input.

Appellant's assertion that the prior art must teach how to calculate parameters as per his formulas is not reasonable or correct. Rather it is only necessary that the prior art define a set of parameters that reside within the broad ranges defined by claim 2.

It is therefore felt that the final rejections proper.

Any inquiry concerning this communication should be directed to Examiner Church at telephone number (571) 272-2488.



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